

Section 26-2 Sponges

SECTION REVIEW

In this section you learned about the characteristics of sponges, which belong to the phylum Porifera. You discovered that these animals are among the most ancient on Earth and that they inhabit almost all areas of the sea.

Sponges are so different from other animals that they were once thought to be plants. They barely move, and they have no specialized tissues or organ systems and nothing that

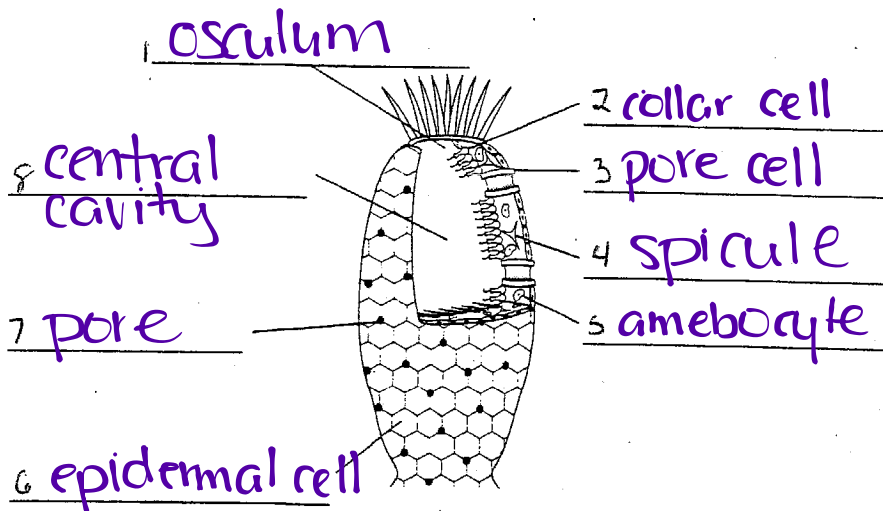
resembles a mouth or a gut. Most biologists believe that sponges evolved from single-celled ancestors separately from other multicellular animals.

Sponges are filter feeders that sift microscopic particles of food from water. The body of a sponge is designed so that water flowing through a central cavity serves as the respiratory, excretory, and internal transport systems.

Applying Definitions: Building Vocabulary Skills

- A. Use the terms in the accompanying list to label the diagram.
- B. In the space provided, write the term that best matches each of the following definitions.

- amebocyte
- central cavity
- collar cell
- epidermal cell
- osculum
- pore
- pore cell
- spicule



- central cavity 1. The area enclosed by the body wall of the sponge
- amebocyte 2. A special kind of cell that builds spicules
- collar cell 3. Cells that have flagella and trap food particles.
- pore 4. One of thousands of openings in the body wall
- osculum 5. Large hole where water leaves the sponge
- spicule 6. One of many structures that form the skeleton of the sponge
- pore cell 7. Specialized cell through which water enters the sponge
- epidermal cell 8. Cell on the outer surface of the sponge

2. Trace the path of a drop of red dye that is placed in the water near the base of a healthy sponge. Assume that sponge cells do not pick up this dye.

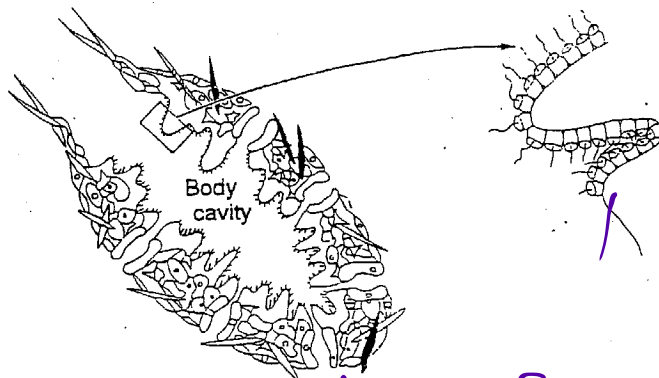
Red dye passes through pore cells (powered by flagella), into central cavity then out through osculum

3. Trace the path of a microscopic particle of food that is placed in the water at the base of a sponge.

Food moves in through pore cells, sticks to collar cells, engulfed by collar cells, pass to amoebocyte, deliver to rest of cells, waste released into water

4. Complex sponges have folds in their body walls. Figure 2 shows a cross section of a complex sponge. Which sponge can move water through its body faster: the simple sponge or the complex sponge? Explain your answer.

Figure 2



complex sponge - greater surface area for absorption of H_2O

→ more collar cells = more flagella = more H_2O pumped in

5. Colchicine is a chemical that stops the action of flagella. What would happen to these sponges if colchicine was present in the water in which they lived?

water would not be pumped into central cavity → would make it difficult for sponge to survive → couldn't get food, O_2 , transport gametes/larvae out of sponge

6. What would happen to a sponge living in a limited supply of stagnant water?

It wouldn't be able to get O_2 which it needs to survive

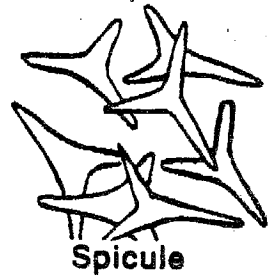
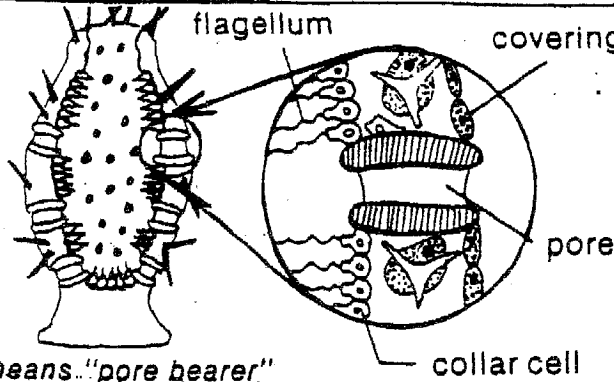
SPONGES

1. Sponges usually stay in one place all their lives. This condition of non-movement is called being sessile.
2. The sponge body contains many different cells working together to carry out its life functions. The collar cells and amebocytes are the two cells responsible for its digestion of solid food.
3. The phylum name Porifera refers to the many pores located all over the sponge's body. The incurrent pores allow the water into the central cavity of the animal, while the osculum allows the water to leave its body.
4. Many times tiny bone-like spicules are found sticking out of the mesoglea (jelly-like material).
5. These bony-like structures are made by the wandering formless cells called the amebocytes.
6. The outer covering of every sponge is constructed of cells called the epidermal cells.
7. Sponges primarily reproduce asexually. The process of budding occurs when a new sponge develops from the side of the older sponge.
8. If the sponge is cut up into many pieces, each piece will grow back the missing parts; this is called regeneration.
9. The currents of water that pass through the sponge's body is caused by the flagella of the collar cells.

Sponges



Wandering Cell



Spicule

Kingdom: Animal

Phylum: Porifera (por-IF-er-uh) means "pore bearer"

The phylum Porifera is made up of the sponges. Most live attached to the bottom in warm sea water (are marine), but some live in fresh water.

Sponges are the simplest of all the animals. Their body is a thick empty sack with a large opening at the top. There are many tiny holes or "pores" along the sides of the sack.

From the drawing above, you can see that the body of the sponge is made up of two layers of cells. The outer cells are covering cells and the inner cells are collar cells. In between is a jelly-like layer. It contains wandering cells which carry food to all parts of the sponge. It also contains spicules which provide support.

If you were to drop red dye next to the sponge, you would see it go in the sides of the sponge and come out the top. This is because the flagella, or little whips on the collar cells, pump water in through the pores and then out through the opening at the top of the sponge. This brings in food which is trapped and digested by the collar cells and picked up by the wandering cells.

The cells in a sponge are not organized into tissues. We know this is true because scientists can squeeze a sponge through a piece of silk and separate it into individual cells. After three weeks, the cells will reorganize themselves into a working sponge all by themselves! No other adult animal can do this.

1. Crossword Puzzle

Use the paragraphs above to help you.

DOWN

1. break down
3. cell with a flagellum
5. ocean living
7. animals in phylum Porifera
9. Tissues are made from _____
11. kingdom we are learning about
13. group
15. Most sponges live in the _____
17. middle "_____ like" layer of cells

ACROSS

2. holes
4. A sponge is like a _____
6. _____ cells carry food around.
8. support structures
10. Sponges have _____ cell layers.
12. _____ pump water through the pores.
14. ocean
16. flagella
18. Water comes in here.
20. phylum of sponges
22. Sponges are _____

